Ecoregional conservation & development in Madagascar

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Acronyms

AGERAS – *Appui à la Gestion Régionale et à l'Approche Spatiale*
CAZ – *Corridor Ankeniheny Zahamena*
CMP – *Comité Multi-Locale de Planification*
EP – Environmental Program
ERC&D – Ecoregional Conservation and Development
ERI – Ecoregional Initiatives
ICDP – Integrated Conservation and Development Project
LDI – Landscape Development Interventions
MAP – Madagascar Action Plan
NEAP – National Environmental Action Plan
NGO – Non Governmental Organization
PA – Protected Area
PlaCAZ – *Plateforme pour la gestion du Corridor Ankeniheny Zahamena*
PTE – *Programme de Transition Environnemental*
SRAT – *Schéma Régional d'Aménagement de Territoire*
USAID – United States Agency for International Development
WCS – Wildlife Conservation Society
WWF – World Wide Fund for Nature

I. Introduction

A. Brief history and terminology of the ecoregional concept

Environmentalists conceived several approaches to broad scale conservation in the 1990s. Prominent among these were ecoregional conservation, developed by the World Wide Fund for Nature (WWF) and The Nature Conservancy, and the living landscapes approach promoted by the Wildlife Conservation Society (WCS). This new paradigm was partly a response to perceived shortcomings of integrated conservation and development projects (ICDPs), namely, that these projects were often too small in geographic scale to ensure the survival of populations of threatened species and maintenance of ecological processes and secondly, that they did not adequately address the root causes of habitat degradation and species loss. The conservation community thus strove to look beyond the boundaries of protected areas, tackling threats and pressures in the larger landscape and beyond.

Communicating and clarifying the size of these broad scale endeavors to the general public is often problematic and compounded by the fact that different terms exist. WWF defines an ecoregion as a large area of land or water that contains a geographically distinct assemblage of natural communities that (a) share a large majority of their species and ecological dynamics, (b) share similar environmental conditions, and (c) interact ecologically in ways that are critical for their long-term persistence (Dinerstein et al., 2000). Other practitioners prefer the use of the term landscape or priority areas. It is useful to note that there is really no fixed size or range of sizes for an ecoregion, a landscape or a priority area; different authors use the terms differently (Loucks et al., 2004). Ecoregion sizes can range from 35,000 to 142,000 km2 whereas references to landscapes as small as 3 km2 and as large as 30,000 km2 can be found. In general, these areas are usually composed of a mosaic of sites and more than one protected area (Aldrich et al., 2004).

II. Rationale for the ecoregional conservation and development (ERC&D) approach

A. Why the approach is needed for biodiversity conservation

The biological justification for the broad scale conservation paradigm has been well established (see for example various publications by Reed F. Noss from the 1980s and 1990s). Large areas of natural habitat are needed to maintain ecological and evolutionary processes and viable populations of threatened species. Connectivity is important; without it, small, isolated fragments of natural forest will slowly degrade and lose the majority of their species. Many protected areas throughout the world are actually too small to satisfy many of these criteria. Managing them within a larger landscape – for example, ensuring they are re-connected to other natural habitat – is thus of vital concern.

Socio-economic justification for broad scale conservation efforts is also evident. Successful natural resources management or biodiversity protection initiatives are impossible without understanding the social context in which these undertakings operate as well as the drivers behind land use and natural resource change. In addition, many threats to biodiversity are socio-economic in nature and often function at large scales; their sources may even originate outside of the ecoregion or landscape in question. Large scale threats demand multi-scale (including large scale) responses and strategic, coordinated action among many social groups and stakeholders.

Comprehending the socio-economic milieu at the ecoregional or landscape scale is thus a necessity when designing or selecting appropriate natural resource management or conservation strategies (Loucks et al., 2004).

B. Why the approach is also needed for rural development

In order to avoid scattered, uncoordinated actions and to foster wider impacts, rural development efforts also need to occur at a large scale. Many current rural development initiatives occur at a small scale and are divorced from land use visions for the broader landscape in which they operate; this limits their impact in the medium and long term as well as with respect to expansion across a larger area. Connecting rural development initiatives to a broad scale or landscape vision will avoid duplication and contradictions and will enhance the potential for exchange and learning and replication or scaling up of successful practices; it will also enable a strategic application of resources to key opportunities and threats. Moreover, coordination and planning within a landscape or ecoregion favors much-needed partnerships: in most cases, a single actor cannot realize a broad scale sustainable development[1] (or biodiversity) vision alone – a multi-stakeholder coalition is needed. From a conservation standpoint, addressing threats within a development context is essential to finding solutions to socio-economic causes of unsustainable resource use – often the origin of habitat degradation and biodiversity loss. Finally, broad scale conservation efforts must include a rural development component that encompasses a similar scale for the simple reason that the priority of local communities living in biodiversity-rich landscapes (at least in tropical, developing countries) is socio-economic development, not conservation.

C. Overall rationale for ERC&D approach

It seems clear that if we are going to achieve sustainable development and biodiversity conservation over large areas – ecoregions or landscapes – development and conservation concerns must be addressed together. There are many reasons for linking the two. First and foremost is the fact that natural areas within a given landscape have an effect on or influence the human-transformed parts of the landscape and vice versa. For example water, which is a key resource for agriculture and other human activities, often flows from natural forest areas in a landscape. Similarly, energy for human use is often generated by hydroelectric plants that depend on wise management and minimal disturbance of natural areas. It may be more cost efficient in the long run to undertake development (e.g., production forestry) and conservation actions together within a large scale program; this will allow for a more economical use of funds and staff and will favor synergies (Aldrich et al., 2004). In short, altered areas and natural areas are connected in many ways and it is unwise to separate or dissociate the two.

Successful broad scale conservation or development efforts also depend on exemplary planning and coordination. One cannot move ahead with conservation activities without knowing the plans and trends for land use adjacent to and even sizable distances from the targeted biodiversity-rich areas. Landscape or ecoregion management is also facilitated by a holistic vision and accompanying land use plans that consider and anticipate current and future development tendencies; a conservation vision that ignores these elements is likely doomed to

[1] Although this term has become somewhat diluted, we use it in its initial sense: development that meets the needs of current generations without compromising the capacity of future generations to do the same (World Commission on Environment and Development, 1987).

failure. One intriguing concept that illustrates the large scale links between conservation and development is the establishment of economic development poles or corridors in order to encourage migration away from biodiversity-rich natural areas in a landscape, and, at the same time, to reduce pressure on these areas. A final concern that is critical for coherent actions over a large region is the need for strong coordinating institutions. It is well and good to stress the inseparable nature of conservation and development, but without an organization that can facilitate partnerships, assure checks and balances, and constantly promote the overall land use plan or landscape vision, actors will eventually revert to insular activities.

It should be noted, however, that a balance must be found between coordination and planning in contrast to actual, field-level implementation: the ecoregional approach has been criticized in some quarters for putting too much emphasis on the former and not enough on the latter. Ecoregional practitioners also need to avoid over-promotion of the "large" or "big" aspect of the paradigm: the challenge is often working at and linking multiple scales rather than a unique focus on large scale concerns.

III. Implementation in Madagascar

A. Initial adaptation and application

Madagascar was one of the first developing countries to design and implement a National Environmental Action Plan (NEAP). Starting in 1990, NEAP activities commenced at the field level; they were organized into three phases that spanned, roughly, 1990 to 1995, 1996 to 2002 and 2002 to present. During the first phase (EP1), several international and American NGOs employed an ICDP approach to biodiversity conservation, generating mixed results. Among the many lessons learned, cited by McCoy and Razafindrainibe (1997), participants noted the need for longer project cycles in order to change behavior as well as the imperative to expand planning and application to a regional scale. There was also an admission that community-level appraisals were cursory, leading to flawed analysis and that the root causes of the main pressures on protected areas received inadequate consideration. Moreover, there was a general perception that the conservation organizations who managed the majority of the ICDPs were not well suited to addressing the socio-economic needs of the rural population in the larger landscape[2].

Figure 1: Timeline of Madagascar's NEAP and associated USAID projects

Period	NEAP Phase	USAID Projects
1990-1995	EP1	ICDPs
1996-2002	EP2	LDI
2002-2008	EP3	ERI

These concerns influenced the second phase of the NEAP: the ICDP paradigm was virtually abandoned as development and conservation activities expanded in scope and endeavored to address the origins of biodiversity loss. In short, there was widespread recognition that biodiversity conservation could not be achieved by addressing threats in a narrow peripheral area adjacent to Protected Areas (PA); efforts needed to address socio-economic pressures in the larger landscape (USAID, 1997; USAID, 2004; World Bank, 1996; World Bank, 1997). Consequently, the United States Agency for International Development (USAID) designed the Landscape Development Interventions (LDI) project which operated in three large zareas or ecoregions in Madagascar, two of which had forest corridors at their core. This broad-scale

[2] Critiques of ICDPs were not unique to Madagascar; see, for example, Barrett and Arcese (1995) and McShane and Wells (2004).

approach to development and conservation was continued during the third phase of the NEAP via the Ecoregional Initiatives (ERI) program (see Figure 1 for a synopsis of NEAP phases and associated USAID projects). During the same period, WWF implemented an ecoregional conservation program in the spiny forest ecoregion and WCS used elements of a landscape approach in the Masoala and Makira areas.

Although there was recognition of the need for a broad-scale or ecoregional approach to development and conservation, targeted implementation in priority landscapes was limited. Among the multi- and bi-lateral donors, USAID seems to have been the only institution that fully embraced the approach. This may be partly attributed to the influence of major, environmental non governmental organizations (NGOs), such as WWF (Medley, 2004). Although World Bank documents (World Bank, 1996; World Bank 2007) reference the concept, it can be argued that the second phase of the Environmental Program (EP2) and current EP3 interventions were and are somewhat scattered and dispersed, not necessarily directed at priority landscapes. For example, the project appraisal for EP3 states that interventions will occur in 530 rural communes representing 55% of the area of the country (World Bank, 2004).

B. LDI/PTE experience

1. Context

The LDI program, and the short transition project (*Programme de Transition Environnementale* or PTE) that followed, together operated for five and a half years from 1999 to 2004. The environmental context during this period was shaped by the second phase of the environmental program (EP2) which emphasized mainstreaming environmental concerns, decentralization and regional coordination, local management of natural resources, and improved linkages to rural development. Environmental NGOs, notably WWF, also exerted a considerable influence on EP2 and the environmental programs of donors – USAID's adoption of the ecoregional approach being a significant example (Medley, 2004).

In general, LDI and PTE strove to implement key findings from the EP1 assessment, expanding the scale of interventions well beyond the periphery of key PAs and threatened natural habitat. They explicitly focused on agricultural intensification as a means to reducing traditional, extensive, slash and burn agriculture – the main pressure on the biodiversity-rich forests[3]. Specifically, these programs promoted an agro-ecological approach, introducing appropriate intensification and diversification techniques into corresponding agricultural niches (e.g., hillsides or *tanety* and lowland areas). In general, rural transport systems, admittedly a key to sustainable, economic development in order to connect products to markets, remained fragile and in need of rehabilitation. These needs were exacerbated due to the destruction of infrastructure caused by several strong cyclones during the life of the programs. Additionally, transfer of management responsibility for natural resources from the State to local communities via the GELOSE (*Gestion Locale Sécurisée*) and GCF (*Gestion Contractualisée des Forêts*) procedures began to be thoroughly tested or implemented during this period.

[3] LDI did not have a specific biodiversity conservation objective. It can be argued, however, that LDI targeted biodiversity conservation indirectly by focusing on the main threat to habitat loss: an extensive agricultural system that employed slash and burn practices.

2. Results & discussion

The most impressive of the myriad results of the LDI program were arguably linked to the agricultural sector. Significant increases in the production of crops and selected livestock were achieved via the agro-ecological approach. The program laid the foundation for a farmer's movement committed to an improved (intensified and diversified) and environmentally-friendly agricultural system and also began an innovative farmer-to-farmer extension system.

With regard to the ecoregional approach, LDI conducted informational campaigns on regional or broad scale issues affecting conservation of natural resources and began supporting regional planning bodies and platforms. This latter activity included working with a multitude of stakeholders to raise environmental awareness, to begin development of shared visions, to improve definition of objectives, and to implement coordinated actions. Some activities, especially in Fianarantsoa, explicitly focused on maintaining and stimulating the regional economy via constant attention to the key element of the rural transport system. The broad scale focus was sharpened under PTE which devoted significant resources to strengthening the capacity of regional planning institutions, helping them to finalize and synthesize development plans and laying the foundation for informational analysis and communication.

One of the most significant sets of findings from the LDI/PTE era relates to scale. Although it was recognized that the program operated at a much larger scale than the ICDPs of EP1, the anticipated impact on the large forest corridors – a significant decrease in habitat loss or forest conversion – within the target landscapes was still perceived to be unsatisfactory. This was due to the fact that only a minority of farmers in the landscape adopted LDI's package of intensive, environmentally-friendly agricultural techniques[4]. Similarly, LDI intervened in only a fraction of villages and zones within the landscape. The conclusion was that the intervention zones needed to be expanded and that a much larger number of farmers needed to join the movement[5] committed to a new, less destructive, farming system.

In general, it seems that the ecoregional approach was implicit rather than explicit during the LDI period. This is evidenced by the fact that it was not cited in the program's sub-results nor was there a specific ecoregional indicator. Apparently, the issue of scale began to receive increased attention during the second half of the program, leading to the recommendations regarding scaling up or expansion – to be initiated by PTE and fully implemented by the subsequent program (ERI). Similarly, spatial analysis and integrated land use planning do not seem to have been accentuated during LDI. This is possibly due to the fact that there was an EP2 component – AGERAS (*Appui à la Gestion Régionale et à l'Approche Spatiale*) – that was supposed to take the lead on this aspect of the ecoregional approach. Nevertheless, AGERAS[6] does not seem to have been one of LDI's key partners as it receives scant mention in the LDI reports.

LDI viewed a vibrant rural economy as a key element of the ecoregional approach. The need to improve linkages between rural producer groups and regional, national and foreign markets was recognized and the program did focus, to a certain extent, on the commercial aspects of agricultural production. The economic pole hypothesis was also cited and some attempts made at developing the foundations needed to test it. The idea was that, by building a thriving cash crop economy in coastal areas (e.g., Fenerive Est,

[4] This was due to a number of factors including higher costs for implementing the new techniques and a lack of access to credit.

[5] The *Koloharena* movement, initiated by LDI and continued under ERI, consisted of farmer associations, federations and cooperatives dedicated to raising the revenues of member households via the adoption of an intensive and integrated farming system that respected the environment.

[6] It is important to note that the ecoregional, multi-stakeholder platforms – the CMP and PlaCAZ – emerged from the AGERAS process and are now key partners of the ERI program.

Vatomandry, and Manakara), people living closer to the forest corridors would be enticed to migrate to these coastal poles. However, migration data needed to support or refute this hypothesis is lacking[7].

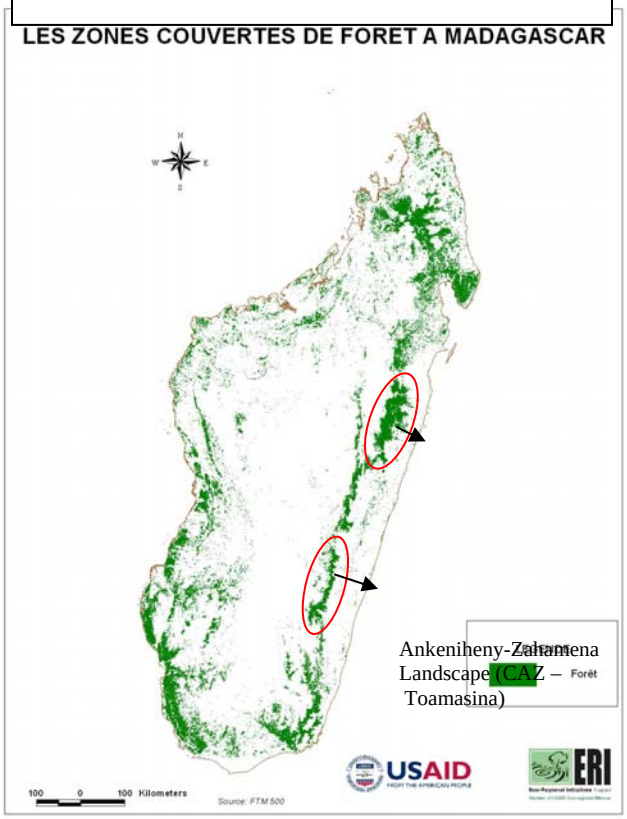
Cost constituted another notable aspect of the LDI program: it was criticized in some quarters as being too expensive. In contrast, program proponents noted that broad scale rural development does require significant resources and that some attention had been given to designing cost effective activities and structures. The farmer-to-farmer extension system was a case in point. Yet there is also a seeming contradiction linked to this issue: LDI recognized the need to scale up, yet the subsequent program (ERI) received less funding than LDI but at the same time was expected to expand the operational area and increase the scale of LDI's impacts. This circumstance was perhaps due to a USAID program design decision: scaling up should be achieved via leveraging other actors and improved coordination amongst projects.

C. ERI experience

1. Context

Building on the LDI and PTE experience, the ERI program began field activities in and around natural forest corridors in the Fianarantsoa and Toamasina regions in the second half of 2004 (see Figure 2 for the location of ERI's focal landscapes). The overarching goal of the program was similar to that of LDI: transforming traditional farming systems in order to reduce slash and burn agriculture[8] and thus indirectly conserve the forest corridors[9]. Compared to LDI, community-based forest management and the ecoregional approach received greater emphasis.

Figure 2: Location of ERI landscapes



Many contextual elements carried over from the LDI epoch, including continued pressure on forest resources, fragile coordinating institutions, and the need to scale up interventions. Yet several new circumstances appeared or were more accentuated at the start of the ERI program. Foremost among these were the expansion of the Malagasy Protected Area System[10] and the proposal of both the Fianarantsoa and Toamasina forest corridors as new PAs. Overall, many of the new PAs were much larger – on the order of 500,000 ha – than existing reserves. This sparked a debate on the category[11] or zoning of these new PAs: should they be strict protected areas or multiple use areas that included an overarching biodiversity conservation goal? The

[7] This may be due to the fact that funding is unavailable for the long-term research needed to produce the necessary data.
[8] Forest cover change was chosen as the indicator to measure this goal; baseline data existed via satellite imagery.
[9] Slash and burn agriculture is the greatest pressure on natural forests in eastern Madagascar.
[10] Known as the Durban Vision, this is a Presidential initiative aimed at tripling the size of the Malagasy PA network.
[11] The six internationally recognized IUCN categories were used as a reference for the debate.

scrutiny was partially fueled by concerns about balancing conservation with economic development.

Another new development that coincided with ERI's commencement was the advent of new, administrative entities known as *Régions*. In a bid to revitalize decentralization efforts, twenty-two of these units were established across the country. As one of the *Régions'* main roles was coordination of development[12] initiatives, the continued relevance of ecoregional coordination bodies (e.g., CMP and PlaCAZ) was called into question.

The ERI period also witnessed a growing frustration and skepticism regarding community-based natural resource management. Many stakeholders, often urban-based elite, expressed doubt regarding the ability or capacity of local associations to manage sustainably or in a sound manner, the resources that had been transferred to them (pers. obs.). Much of this concern was due to the fact that many natural resources – usually forest – management transfer agreements had been initially supported by NGOs or projects, but once the agreement was signed, much of the support vanished and associations were left to their own devices. Yet, at the same time, there was a growing recognition that environmental governance was a major problem and needed to be improved (Raik & Decker, 2007). Some argued that this improved governance needed to start at the local level.

There was an expectation that ERI would scale-up or replicate successful interventions, including those that were developed during the LDI era. With limited resources, one of the only options for expansion was via other stakeholders and leveraged funds and partnerships. This proved extremely difficult due to the fact that ERI largely worked in isolated, rural areas that lacked other development NGOs or where potential partners were unwilling to operate[13].

A final concept that received heightened interest during the commencement of the ERI Program was the establishment of economic corridors or development poles. Proponents maintained that these development hubs were essential to any conservation effort as they would act as magnets and pull the rural population away from natural, biodiversity-rich areas within the ERI ecoregions or landscapes. While the theory[14] was attractive, many questions remained related to migratory movements and the time and resources needed to establish these poles.

2. Results, constraints & discussion

The key to sustainable development and arguably conservation in the ERI landscapes is agriculture. The livelihood of the vast majority of the rural population is based on agriculture and the traditional, shifting cultivation practice constitutes the main pressure on biodiversity. Building on LDI's farmer-to-farmer paradigm and producer group structure, ERI made great strides towards perpetuating agricultural intensification in some parts of the landscapes. Subsequent forest cover change analysis conducted by Conservation International and JariAla (another USAID-funded project) seemed to suggest that forest loss was reduced in target, USAID landscapes compared to other areas of the country. In other areas of the ecoregions the

[12] Here, the interpretation of "development" is fairly broad and includes conservation activities as well as almost any sort of project or program that intervenes within the boundaries of the *Régions*.
[13] The aversion was ostensibly due to higher operating costs, low population densities, and the difficulty of finding qualified personnel willing to work in these areas.
[14] In reality, the theory did not benefit from detailed planning and was never rendered operational.

Koloharena producer group and cooperative model was in its infancy or entirely lacking at the start of the ERI program. The main constraints included a lack of human resources – field agents or partners – needed to promote the agricultural intensification paradigm on a large scale and sufficient revenue generation from agricultural production needed to sustain farmer-based agricultural extension. The income generation or commercial problem was compounded by the fact that many areas where the program operated were extremely isolated, lacking the necessary infrastructure to link producers to markets.

A coalition of stakeholders, supported in large part by the ERI program, produced significant results regarding development of an ecoregional vision. For example, using WWF expertise and building on Conservation International's efforts to identify priority biodiversity areas within the landscape, the regional coordination body for the Toamasina corridor – PlaCAZ (*Plateforme pour la Gestion du Corridor Ankeniheny Zahamena*) – finalized the sustainable development vision for the greater Ankeniheny-Zahamena forest corridor in early 2007. This was the culmination of a process that spanned more than a year and that included consultations with stakeholders in the five Districts that overlap with the Ankeniheny-Zahamena forest corridor.

As can be imagined, the process was not without difficulties. Communicating the somewhat abstract concept of ecoregional conservation proved problematic: many stakeholders think and act locally and are stymied by initiatives that go well beyond their traditional spheres of intervention. In the government sphere, commune-level and regional authorities were often not overly enthusiastic about a model that seemed to be driven by biodiversity conservation concerns while relegating rural development interests to a lower tier. Overall, garnering support and internalization of the vision, as well as achieving a consensus, was (and remains) problematic. Based, in part, on these difficulties, the PlaCAZ endeavored to shift the focus of the vision to sustainable development.

At the same time, parallel, large-scale initiatives were ongoing. Efforts to establish the new *Corridor Ankeniheny Zahamena* (CAZ) and *Corridor Fandrina Vondrozo* PAs continued. ERI and other stakeholders endeavored to use this opportunity to promote integrated land use planning and avoid dissociating the new CAZ PA from the surrounding landscape. Commune-level maps were developed that identified potential agricultural investment zones in areas adjacent to the proposed PA. These zones were discussed as part of the public consultation process linked to the creation of the PA.

The *Régions* also began efforts to develop land use plans known as SRAT (*Schéma Régional d'Aménagement du Territoire*). ERI and PlaCAZ participated (and continue to participate) in this process, striving to promote the link between conservation of the forest corridor and agricultural intensification. Additionally, the idea of a belt of sustainable use forest zones, embedded in the new PA and managed by local community associations, was introduced during workshops on the regional plans.

Efforts at a much smaller scale – the village territory – also occurred. ERI program staff worked with local communities in selected territories to develop integrated land use plans. This activity was hindered by the difficulty of explaining and promoting or implementing a multi-disciplinary approach[15] to field agents and villagers but also by problems linked to the traditional tenure system and the difficulties of negotiating trade offs (e.g., foregoing farming in one area of the

[15] Elements of agronomy, forestry, soil conservation and watershed management are essential to the approach.

territory in return for access to land elsewhere in the territory) and compensation within this system. An additional constraint comprised linking these efforts upwards to larger scales, for example, the commune level and the landscape.

In collaboration with other USAID-financed projects, ERI also attempted to promote an integrated rural development approach at the commune-level. This was important for several reasons including that biodiversity conservation is usually not a priority for rural communities, yet the links between nature or natural capital, health or human capital, economic growth and good governance are evident to these communities. The integrated approach was also critical to achieving internalization or ownership of large scale ecoregional or sustainable development visions. Yet, promotion of this approach was hampered by the perennial lack of resources and partners and the fact that there are gaps in the gamut of interventions offered by the USAID partners, namely in the educational and infrastructure sectors. Another implicit obstacle was that the approach was perhaps too ambitious: projects were unable to focus on their own internal objectives and activities and, at the same time, work on integrated development and coordination with other projects.

IV. Lessons, challenges and perspectives

A. The need for development activities and land use planning

For those outside of the environmental movement, the broad scale conservation paradigm can be viewed as an exercise in integrated, sustainable land use. This begs the question: shouldn't conservationists also place it in this context? This concern is especially pertinent in developing countries such as Madagascar where poverty alleviation and socio-economic development are the top priorities, not only at the national level (Government of Madagascar, 2006), but among the rural population (Programme ERI Toamasina, 2006[16]). In this setting, it is important to avoid the perception that biodiversity conservation is more important than human development. It is likely that medium- and long-term broad scale biodiversity conservation results will be much easier to secure if they are part of sustainable development plans and initiatives[17].

The new regional land use plans or *schéma régional d'aménagement de territoire* (SRAT), developed and promoted by the Ministry of Decentralization and Territorial Development, represent an immense opportunity for broad scale conservation. With a bit of lobbying, environmental concerns should become one of the main pillars of the SRATs; after all, sustainable development cannot occur without sound management and conservation of natural resources. In the Ankeniheny-Zahamena landscape, this is already occurring as efforts are underway to incorporate the PlaCAZ's vision for sustainable, ecoregional development into the SRAT for the Alaotra-Mangoro *Région*. On the other hand, convincing powerful economic initiatives such as the nickel mining *Projet Ambatovy* to align with and contribute to the realization of the plan seems more challenging (pers. obs.). The SRATs also seem to be an ideal spatial tool or process for realizing many of the objectives of the current, primary planning

[16] This is only 1 example among 10 appreciative inquiry reports from the ERI Toamasina Program that all demonstrate socio-economic development priorities of the rural population. Based on the author's ten years of experience in Madagascar, nearly all similar rural surveys or appraisals show the same, general development priorities.

[17] At this point in time, most conservationists do recognize the importance of placing broad scale conservation efforts within sustainable development landscapes and the need to consider human development; those who promote conservation dissociated from these concerns appear to be in the minority.

document for development in Madagascar: the Madagascar Action Plan, commonly known as the MAP. Integrated spatial planning tools exist[18] and can be applied so that benefits from biodiversity, environmental services, and improved natural resources use accrue to local communities and to the larger *Régions*.

The challenge then becomes taking the broad scale development vision and negotiating and implementing sustainable land use and biodiversity conservation outcomes on a smaller scale – while at the same time maintaining links to the overall, large-scale vision. In Madagascar, the rural commune scale lends itself to this type of planning and implementation. One of the keys is developing agricultural intensification zones[19] that will eventually obviate the need for continued, extensive slash and burn techniques. The importance of agriculture is underscored by the fact that it is the main component of rural livelihoods for much of the population. One complicating factor linked to these agricultural intensification zones is land tenure. In theory it is likely that trade offs and compensation will have to be negotiated with traditional land owners in the intensification zones and households farming at the forest margins. For example, families farming along the forest fringes in designated agroforestry or permaculture zones must be provided land in the intensification zones for staple crop production as compensation for giving up this type of farming next to the forest.

In order to ensure support and involvement during implementation, sustainable land use planning at the local level must be highly participatory. Traditional leaders need to be involved and a clear explanation and justification of the process provided; this will hopefully solve the engagement problem that has been a challenge for commune-level planning. In short, the rural population – people – must be part of the solution and not viewed as the problem. Trust needs to be developed and the population must sense that their development concerns are being addressed; biodiversity concerns can subsequently be discussed and plans made to incorporate these aspects. If this sequence is followed, the chances for viable, local partnerships and long-term, positive, conservation outcomes seem much more likely[20].

Yet some may ask: what is the real justification for an expensive and often difficult consultative land use planning process[21]? Three answers leap immediately to mind. First of all, the process is needed to avoid disordered and often destructive land use practices by grouping similar land uses into contiguous, designated zones. This will reduce fragmentation of natural habitat (which should also have a positive impact on biodiversity) and could also lead to economies of scale for services such as agricultural extension and infrastructure development. Secondly, the consultative part of the process should lead to agreement and understanding on what land use practices are permitted in what zones, again reducing unplanned and destructive use of natural resources and contributing to conservation and rational use of these resources; in short, environmental governance and stewardship will be improved. Finally, the positive potential of empowerment of local communities via visualization and informed decision-making should not be underestimated.

[18] For example, Development Pathways, a tool employed by Development Alternatives, Inc.
[19] These zones would include cash crops and associated commercialization efforts, thus providing an economic incentive to abandon extensive slash and burn practices.
[20] Although evidence supporting this assertion may exist, the hypothesis is largely untested in Madagascar.
[21] While the process has theoretical advantages and potential, local incentives that can be promoted, it has not yet been tested or implemented in the medium term; results, impacts and sustainability are therefore unknown.

B. Scaling up

Applying best practices and improved techniques to a larger geographic area – commonly referred to as scaling up – continues to be a serious challenge for practitioners of broad scale rural development and conservation. Local, site-specific successes are common, but mechanisms to generalize these achievements to the larger landscape need to be strengthened. At minimum, there must be some sort of extension and communication structure that can reach a large number of households or a large percentage of the rural population, but this structure requires resources[22], both human and monetary, and these resources are often scarce. Programs or projects may have some funds that can be dedicated to extension but rarely does a single program or project have sufficient funds to operate at a landscape or ecoregional scale. A commonly proposed solution is to leverage support from other sources, yet the transaction costs, including lobbying for alignment with a broad scale vision, are often insurmountable: projects or programs conceived outside of the ecoregional conservation paradigm are often unable or unwilling to change course and contribute directly to broad scale programs that they did not initiate. Some maintain that scaling up can only occur once certain enabling conditions are in place such as key policy and economic changes, equitable institutions that can distribute wealth, and local people identifying and understanding behavioral changes that need to occur.

The importance of replicating improved agricultural practices or facilitating agricultural experimentation and innovation at a landscape scale should not be underestimated (but often is): again, agriculture is the principal livelihood component of the vast majority of Madagascar's rural population and shifting cultivation or slash and burn agriculture is usually the greatest threat to natural habitat and biodiversity. Unfortunately, at present there is no operational agricultural extension service in Madagascar[23]. Faced with this vacuum and the obvious need to expand coverage of agricultural intensification techniques, the LDI and subsequent ERI programs have promoted a farmer-to-farmer extension service. Although great strides have been made towards assuring the sustainability of this system, the challenge of paying its recurrent, operational costs remains. The current premise is that commercially-oriented producer groups or cooperatives can generate enough revenue to pay part-time farmer extension agents. Some would argue that this is a utopian vision: worldwide, no operational, agricultural extension service exists without government subsidy (Thévenot, 2006). Another concern is that extension agents must evolve from delivering ready-made technologies and practices to becoming facilitators of experimentation, innovation and adaptation (Sayer & Campbell, 2004); this concern can partially be addressed through the Farmer Field School approach[24]. Local community leadership, ownership and participation are also keys to successful dissemination of best practices at a larger scale. Moreover, local behavior changes must be linked to positive environmental results in order to realize ecoregional visions. Finally, the delivery or dissemination mechanism for best practices is critical and should be included in sustainable development or ecoregional vision implementation plans (Sayer & Campbell, 2004).

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[22] Arguably, a small army of permanent, field-based extension agents and a large number of strategically placed demonstration sites are needed.

[23] It may be that establishing a functional agricultural extension system in Madagascar is another, key enabling condition for biodiversity conservation success. This would seemingly require an injection of funds from outside sources as the Malagasy government does not seem to possess the required resources at present.

[24] It is important to note, however, that Farmer Field Schools are not a panacea: they do have recurrent costs (primarily facilitators) and need to be linked to overarching agricultural research and/or extension structures in order to achieve optimal effectiveness.

A potential lever for scaling up best agricultural practices is attracting private investment. The new *Régions* are well-placed to facilitate this process and, more generally, to mobilize resources for broad scale initiatives. This would include requiring financial and technical partners (donors) and their associated programs and projects to align with broad scale land use visions; this implies increased government willpower and the possibility of saying no to partners (and their funds) who refuse to align. Yet the *Régions* as new institutions need to be supported via capacity building programs before they are capable of fulfilling these functions.

Beyond the traditional view of expanding spatially, there are those who propose a different way of scaling up: assuring that complementary rural development domains are present within the same spatial area – often, specific zones within the larger landscape. This has been achieved to a limited extent in the current USAID ecoregions of Fianarantsoa and Toamasina[25]. Conservation, agricultural, economic growth, health and governance projects and initiatives have achieved considerable spatial overlap and have been able to coordinate – at least partially – field-level interventions. At best, however, only half of the landscapes have been covered by the full array of rural development domains. Efforts to attain greater coverage have been hampered by pre-defined operational zones, a lack of permanent, field-level personnel for many of the projects, and an unwillingness or inability to work in the more difficult access areas of the landscape (usually the high-priority biodiversity areas adjacent to and overlapping with the natural forest).

It is also important for broad scale development and conservation practitioners to realize that challenges, solutions and implementation exist at multiple scales within and beyond the landscape; these scales are not only spatial but also temporal and institutional. One of the keys, perhaps, to a successful ecoregional program is ensuring linkages, coordination and synchronization between these scales (Sayer & Campbell, 2004); this includes building and maintaining good relations – especially respect and trust – between the actors and institutions operating at the various scales. Ideally, this will likely include financial incentives or subsidies for best practices at a local scale in landscapes that have global, biodiversity value[26]. McShane and Wells (2004) have presented a convincing case for working at multiple scales and especially for coordinating the broader policy scale with the more local, field-intervention scale.

Despite their challenges, leveraged partnerships[27] are probably one of the keys to realizing best land use practices at a landscape scale. In order to accumulate a critical mass of ecoregional partners, two elements seem necessary. First of all, the sustainable development or ecoregional vision – including its objectives and modus operandi for attainment – must be endorsed by all of these partners. Realistically, this means that all of the key actors must be full participants in the development of the vision[28]. This also points to the need for an overarching, multi-stakeholder coordinating structure (such as the CMP – *Comité Multi-Local de Planification* – or PlaCAZ –

[25] USAID is at the forefront of promoting an integrated, synergistic multi-sector approach to rural development and conservation among its contractors and grantees. This approach or concern is less evident among other stakeholders contributing to Madagascar's environmental action program.

[26] Global biodiversity value is an obvious asset for Madagascar and should be incorporated as a marketing strategy in Malagasy ecoregional initiatives; it should continue to be promoted by the government including the new, decentralized *Régions*.

[27] Negotiated partnerships that result in other actors contributing resources to the realization or implementation of broad scale development and conservation visions.

[28] The "whole system in a room" approach described and advocated by the Academy for Educational Development (2004) could be applied to insure participation and support. As noted elsewhere in this paper, however, annual convening costs may be significant and may constitute a fundraising challenge.

Plateforme pour la gestion du Corridor Ankeniheny Zahamena) that plays a leadership and advocacy role (and that, ideally, has decision-making power). Secondly, biodiversity conservation and sustainable natural resources management concerns must be incorporated into ongoing and future rural development planning initiatives – for example, the SRAT program currently being implemented in the Alaotra Mangoro *Région*.

C. Stakeholder relations

Consensus building and coordination among a range of diverse stakeholders is perhaps the most difficult aspect of broad scale development and conservation. It is critical that vision establishment is highly participatory and given the needed time to ensure agreement and backing. Unfortunately, these considerations have not always been adequately heeded in Madagascar. Visions have been produced by conservation groups and their allies, leaving a wide swath of sustainable development stakeholders only marginally involved. The result has been a lack of support for the vision, making implementation and coordination difficult at best and significantly raising negotiation and transaction costs[29].

Another challenge comprises communication of the basic concept of, and need for ecoregional conservation. In the past, the paradigm has been presented in terms of biodiversity conservation, rendering identification and participation problematic for stakeholders concerned with rural development and poverty alleviation. Part of the solution is to put an equal emphasis on sustainable development from the outset. Yet even this emphasis does not overcome the challenges of communicating a somewhat abstract concept: coordinated development and conservation across a very large area and the fact that the origins of local impacts and influences often come from afar. Most stakeholders tend to think and act locally, not considering the ramifications beyond their limited operational zones. This underscores the necessity of careful, repeated explanations and a persistent communication campaign so that stakeholders understand the justification for broad scale efforts and are willing to contribute to a vision and goals that surpass small- or medium-scale interventions. Exchange visits outside of local spheres could facilitate understanding and implementation of the overall vision.

The need for widespread agreement on the vision is also crucial for the subsequent implementation phase as no single organization can achieve the vision alone. Building and maintaining partnerships is required in order to advance towards common goals throughout the ecoregion or landscape. This, in turn, points to the imperative of an institution[30] that will lead and coordinate efforts that contribute to the common goals and vision.

In Madagascar, the question of who is the most appropriate institution to play the lead, coordination role does not have a clear answer. During the second phase of the NEAP, multi-stakeholder platforms were established and received mentoring from the AGERAS component. Most of these platforms are now defunct, with the exception of the two regions – Fianarantsoa and Toamasina – where LDI worked and ERI now operates. The sustainability of these coordinating bodies[31] has yet to be secured despite the fact that there are obvious, recurrent

[29] Citizen jury approaches and large stakeholder groupings (e.g., Northern Forest Alliance in the US) used outside of Madagascar may possess experience and lessons applicable to the Malagasy context.
[30] It may be that a single institution is not needed; perhaps a coalition of institutions could play this role.
[31] For example, the CMP or *Comité Multi-Local de Planification* in Fianarantsoa and the PlaCAZ or *Plateforme de gestion du Corridor Ankeniheny-Zahamena* in Toamasina.

operating and other costs. In fact, it can be argued that these bodies need significant resources in order to fulfill their roles. Transaction costs – lobbying and maintaining interest and agreement – are often high due to the varied and often divergent agendas of key actors. Moreover, there is a need to bring all the stakeholders[32] together at least once a year, but the costs are often prohibitive[33].

Besides sustainability, the notion of appropriateness of these platforms has recently been raised. Some argue that government institutions are best placed for playing the lead, coordinating role for broad scale development and conservation. In Madagascar, the advent of the *Régions*, which are analogous in size to priority conservation landscapes or ecoregions, calls into question the need for the platforms established during EP2. The *Régions* have a mandate for coordinating development initiatives within their boundaries and many have recently embarked on integrated land use planning initiatives. The main obstacle, however, is a lack of capacity: to date, the *Régions* only have a skeletal staff and a small budget; in short, they are not yet equipped to fulfill their designated functions. In any case, the government is in many respects the most important stakeholder for broad scale development and conservation due to its decision-making powers with regard to land use. There are many examples outside of Madagascar where the government plays the lead role or will play the lead role in the future (see for example, Dudley, 2006).

At present, there seem to be two major drawbacks to the *Régions* playing this role. First of all, the *Régions* are strongly influenced by politics and are not always willing or able to make decisions that are in the best interests of the priority landscape or ecoregion. Secondly, many of these landscapes or ecoregions surpass the administrative boundaries of a single *Région*, implicating several *Régions* at a time. Despite these drawbacks, it seems that, at minimum, the *Régions* should be implicated and play a technical advisory role in landscape steering committees. In this context, linking broad-scale sustainable development and conservation visions and plans to the MAP could facilitate government involvement.

D. Direct economic benefits from forest resources

In the tropics, one of the greatest challenges is how to achieve conservation among a rural population living in poverty and largely dependent on natural resources for their livelihoods. Long-term success or failure of broad scale biodiversity conservation in developing countries probably depends on the ability of these broad scale programs to facilitate the generation of direct economic benefits for the rural population. The forested landscapes of Madagascar are no exception: it is difficult to imagine how pure, "no touch" protection of large areas of forests coupled with the exclusion of local people could succeed[34]. Unfortunately, until recently, many conservationists and policy makers did not pay sufficient attention to saddling a poor population with the costs of biodiversity conservation – in essence, expecting a free lunch (Hockley & Andriamarovololona, 2007).

[32] Typically in the range of 100 to 150 stakeholder groups.

[33] Due to these constraints, perhaps it is time to consider alternatives to large, annual meetings (i.e., alternative communication or outreach strategies); these could include smaller, local meetings, bi-annual groupings, focus groups or steering committee meetings.

[34] One possible exception is direct payment schemes: pure protection may succeed if local people are paid not to touch the forest.

Rather, a much greater emphasis is needed on developing forest management regimes that achieve conservation via sustainable use, including low-level extraction and sale of forest products. This should probably constitute a major pillar of broad scale development and conservation in the short and medium term. In parallel, efforts should commence on developing alternative, minimum impact forest-based enterprises such as ecotourism and payments for environmental services. These activities could then replace the extractive pillar in the medium and long term.

Linked to this, is the question of governance. Madagascar, like many other developing countries in the tropics, has developed and adopted policies and laws during the past 15 years that allow for transfer of forest management responsibility from the State to local communities. This is logical, pragmatic and defensible as it directly implicates those living closest to the resource in its day-to-day management; it also provides an opportunity for forest-derived economic benefits for local communities and thus provides a link to development and poverty alleviation concerns. Currently, a large percentage of Madagascar's remaining forests are proposed for PA status. Taking into account past trends and thinking, co-management regimes for these new PAs are being widely proposed.

Generating revenue via local-level forest management is not without potential obstacles. First of all, with regard to governance, some sort of unifying structure is probably needed to assure coherence of the management regimes. Otherwise, there will be a risk of widely divergent practices and negative impacts on biodiversity among the many scattered and isolated managing communities. Secondly, specific areas of the forest may be better suited to revenue-generation activities due to characteristics such as accessibility and populations of targeted species. In order to evenly distribute benefits among local communities who co-manage large forest corridors and in order to assure coherence of the management regimes, a federation of managing community associations has been proposed: Hockley and Andriamarovololona (2007) provide an in-depth analysis of the economics of local forest management and a solid justification for the proposed federation. Another role and basis for the federation is marketing: this unifying structure could market, for example, the ecotourism potential of the large forest corridor to a wide array of clients and prospective partners.

E. Investing beyond the typical project cycle

Broad scale development and conservation initiatives do not easily lend themselves to the typical funding cycles of multi- and bi-lateral donors. Four or five years are simply not sufficient to produce, champion, and implement a consensus vision for integrated land use across a vast area. Many of the behavioral and socio-economic changes needed to achieve sustainable development and conservation occur incrementally during a decade or more and thus demand a decade or more of unrelenting attention and resources. In contrast, most donor-funded projects encourage short-term goals and a concomitant scramble to achieve results (and spend money) in a relatively brief period (Sayer & Campbell, 2004). This is in opposition to what is required: those promoting broad scale or ecoregional development and conservation need to think in, and act during decades not years.

Consequently, a medium- or long-term program approach with committed stakeholders is needed. Ideally, these stakeholders should be prepared to invest in the target landscape for at least 15 years. Again, ideally, funding will be flexible and available during a period that

surpasses the typical project cycle. To cite one example: broad scale development and conservation initiatives need to convene representatives of key stakeholders – usually over 100 in most landscapes – on at least an annual basis to review progress towards medium-term goals and targets and long-term visions. These assemblies are also needed to make decisions on changing course, if needed, to renew commitments and assure that a consensus is maintained, and to insure that a culture of learning and adaptive management continues. This is thus an example of a significant recurrent cost that requires medium-term funding[35]. These observations underscore the need for a dynamic fundraising component for ecoregional development and conservation programs; this seems to be especially true in developing countries where significant government contributions are unlikely. Happily, some conservation NGOs (e.g., WWF and WCS) are making medium-term commitments to target landscapes; unfortunately, this trend does not seem to be as apparent among rural development institutions or organizations.

F. Towards a new adaptation of ERC&D in Madagascar (and beyond?)

As we near the end of Madagascar's NEAP and the current cycle of USAID programs, the moment is opportune to once again adapt the ecoregional conservation paradigm. Numerous improvements have been suggested in this paper for the broad scale conservation and development approach. A summary of the key points needed to assure the success of ecoregional conservation and development in Madagascar follows.

Given the continued poverty of Madagascar's rural population, sustainable development, not biodiversity conservation, should be the driver of broad scale development and conservation initiatives. The fact that development, and not conservation, is the priority of local communities lends additional credence to this point. At the very least, biodiversity conservation and sustainable development need to receive equal emphasis in landscape scale programs. Moreover, agriculture as the foundation of the population's livelihood strategy must continue to receive unrelenting attention[36]. These concerns are likely applicable to other tropical, developing countries.

Efforts to achieve a consensus on the sustainable development or ecoregional vision and to attain widespread support, backing and endorsement must be strengthened. This can be realized through a dynamic and vigilant coordinating body that conducts frequent communication campaigns to explain the advantages of broad scale development and conservation and to advocate for contributions to, or alignment with the vision. Explanations should include why both conservation and development are needed. The consensus can also be achieved via widespread participation in the development of the vision. Perhaps the time has come to re-convene stakeholders in a given target landscape in order to significantly revise and adapt current development and conservation visions; this would also provide an occasion to ensure harmonization of the visions with the MAP and regional development plans. These efforts would hopefully lead to a more solid coalition of partners working towards a common vision.

[35] Again, careful consideration needs to be devoted to the question of the need for large, annual assemblies; other adaptive management alternatives should be considered.

[36] Maintaining soil fertility must be a key component of any agricultural program: if this is ignored, intensification and diversification techniques may be abandoned as soil fertility is depleted and a return to forest conversion for agricultural production could recommence (Freudenberger & Razanajatovo, 2007).

Communication should not be limited to major cities and towns in the landscape but must reach villages adjacent to biodiversity-rich areas. The vision should not only be explained to local communities, but a dialog on its implementation must commence or be strengthened. This will inevitably lead to the process of negotiating land use tradeoffs – a critical process that has received scant attention to date. These elements will render broad scale development and conservation initiatives more participatory and should contribute positively to establishing co-management regimes for the new, large PAs at the heart of many priority landscapes.

More precision in the vocabulary would be helpful. The use of the term "ecoregion," initially coined by conservationists and defined by biological criteria, is confusing to many rural development practitioners. "Landscape" seems more appropriate as well as more emphasis on integrated land use or integrated landscape development. A simple definition of ERC&D would also help in communication and advocacy efforts; a suggested definition is offered in the adjoining text box.

Ecoregional conservation and development: a broad or landscape scale, integrated natural resource use approach that aims at achieving coordinated, sustainable development and biodiversity conservation, thus ensuring a balance between humans and other forms of nature.

Economic concerns must also garner continued awareness. The commercial aspects of agricultural production cannot be neglected, including maintenance and improvement of the rural transport system. Solutions aimed at assuring that economic benefits from forest services or products arrive at the local community level need to be found. In short, those living next to the forest resource and co-managing it must be remunerated for bearing the costs of biodiversity conservation.

Perhaps most importantly, ERC&D practitioners must redouble efforts to partner with government institutions. Ideally, this would result in the government leading ERC&D efforts; at minimum, the new *Régions* must endorse sustainable development or ecoregional visions. Again, the current SRAT initiatives, coupled with MAP objectives, seem to be an ideal opening to insure inclusion of key elements of the vision in government land use plans. It also represents an opportunity to communicate and advocate for the vision and, eventually, to achieve endorsement. At the very least, proponents need to make certain that environmental concerns are incorporated into government sustainable development plans and initiatives. Linked to this, the importance of a spatial vision, translated to an integrated land use or landscape development plan is critical to achieving ERC&D goals. Site-specific and commune-level actions must occur and must be aligned with the broader vision. To transform the adage: one needs to act locally and think at the landscape level.

If these suggestions are heeded, there is every reason to hope that positive development and conservation outcomes can be achieved in Madagascar during the next two decades.

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